AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. **(Withdrawn)** A method of polynucleotide synthesis, comprising: combining in a polymerization reaction mixture a thermostable polymerase, a template nucleic acid molecule, appropriate primers for the template nucleic acid molecule, at least one deoxynucleoside triphosphate, and a non-nucleic acid polyanion, wherein the temperature of the polymerization reaction mixture is at a temperature at which the non-nucleic acid polyanion inhibits thermostable polymerase activity; and heating the polymerization reaction mixture to a temperature at which the non-nucleic acid polyanion dissociates from the thermostable polymerase, allowing the thermostable polymerase to recognize and provide polynucleotide synthesis on a primer annealed nucleic acid molecule.

2. **(Withdrawn)** The method of claim 1 wherein the polynucleotide synthesis is polymerase chain reaction

3. **(Withdrawn)** The method of claim 1 wherein the non-nucleic acid polyanion has a molecular weight of from 1500 to 500,000.

4. **(Withdrawn)** The method of claim 1 wherein the non-nucleic acid polyanion has a molecular weight of from 4,000 to 15,000.

5. **(Withdrawn)** The method of claim 1 wherein the non-nucleic acid polyanion has a molecular weight of from 5,000 to 10,000.

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5. **(Withdrawn)** The method of claim 1 wherein the non-nucleic acid polyanion has a molecular weight of from 5,000 to 10,000.

6. **(Withdrawn)** The method of claim 1 wherein the non-nucleic-acid polyanion is a synthetic organic polysulfate selected from the group poly(anetholsulfonic acid) polyvinyl sulfate and polystyrene sulfate.

7. **(Withdrawn)** The method of claim 6 wherein the non-nucleic acid polyanion is a sulfated oligo- or polysaccharide.

8. **(Withdrawn)** A method of polynucleotide synthesis, comprising: combining in a polymerization reaction mixture a thermostable polymerase, a template nucleic acid molecule, appropriate primers for the template nucleic acid molecule, at least one deoxynucleoside triphosphate, and a polymer or copolymer of sugars selected from the group consisting of glucose, N-acetyl-glucosamine, galactouronic acid, hyalouronic acid, Nacetyl-galactosamine and sulfated fucose, wherein the temperature of the polymerization reaction mixture is at a temperature at which the polymer or copolymer inhibits thermostable polymerase activity; heating the polymerization mixture to a temperature at which the template nucleic acid molecule is denatured from a double-stranded molecule to a single-stranded molecule; cooling the polymerization mixture to a temperature of from about 45° C to about 65° C to allow appropriate primers to anneal to the single-stranded molecule; and modifying the polymerization mixture to a temperature at which the polymer or copolymer is substantially dissociated from the thermostable polymerase and the thermostable polymerase recognizes and provides polynucleotide synthesis on primer annealed nucleic acid molecule.

9. **(Withdrawn)** The method of claim 8 wherein the sulfated polymer or copolymer of sugars is selected from the group consisting of dextran sulfate, fucoidan, heparin; heparan sulfate, chondroitin polysulfate, keratan polysulfate, xylaR poly, sulfate, and pentosan polysulfate.

10. **(Withdrawn)** The method of claim 1 wherein the non-nucleic acid polyanion is at a final reaction concentration of from 0.1 μM to 1.5 μM.

11. **(Withdrawn)** The method of claim 1 wherein the non-nucleic acid polyanion is at a final reaction concentration of from 0.2 μM to 1.0 μM.

12. **(Withdrawn)** A method of polynucleotide synthesis, comprising: combining in a polymerization reaction mixture a thermostable polymerase, a template nucleic acid molecule, appropriate primers for the template nucleic acid molecule, at least one deoxynucleoside triphosphate, and a non-nucleic acid polyanion, wherein the temperature of the polymerization reaction mixture is at a temperature at which the non-nucleic acid polyanion inhibits thermostable polymerase activity; heating the polymerization reaction mixture to a temperature at which the template nucleic acid molecule is denatured from a double-stranded molecule to a single-stranded molecule; cooling the polymerization reaction mixture to a temperature at which appropriate primers anneal to the single-stranded molecule; and modifying the temperature of the polymerization reaction mixture to 60° C to 75° C wherein the non-nucleic polyanion substantially ceases to inhibit thermostable polymerase activity.

13. **(Withdrawn)** A method of polynucleotide synthesis, comprising: combining in a polymerization reaction mixture a thermostable polymerase selected from the group consisting of DNA polymerase, RNA polymerase, reverse transcriptase, and mixtures thereof, a template nucleic acid molecule, and appropriate primers for the template nucleic acid molecule, at least one deoxynucleoside triphosphate, and a non-nucleic acid polyanion, wherein the temperature of the polymerization reaction mixture is at a temperature at which the non-nucleic acid polyanion inhibits thermostable polymerase activity; heating the polymerization reaction mixture to a temperature at which the template nucleic acid molecule is denatured from a double-stranded molecule to a single-stranded molecule; cooling the polymerization reaction mixture to a temperature at which appropriate primers anneal to the single-stranded molecule; and modifying the temperature of the polymerization reaction mixture to a temperature at which the non-nucleic polyanion is substantially dissociated from the thermostable polymerise, wherein the thermostable polymerise recognizes and provides polynucleotide synthesis on primer annealed nucleic acid molecule.

14. **(Withdrawn)** The method of claim 13 wherein the reverse transcriptase is a derivative, mutant or chimeric complex of the reverse transcriptase.

15. **(Original)** A kit for polynucleotide synthesis on a target nucleic acid, the kit comprising: a thermostable polymerase reversibly bound to a non-nucleic acid polyanion; and an appropriate polymerase reaction buffer.

16. **(Original)** The kit of claim 15 wherein the thermostable polymerase is Thermus aquaticus.

17. **(Original)** The kit of claim 15 wherein the non-nucleic acid polyanion is dextran sulfate.

18. **(Original)** The kit of claim 15 further comprising at least one nucleotide 5'-triphosphate.

19. **(Original)** The kit of claim 15 further comprising a pair of primers for the target nucleic acid.

20. **(Currently Amended)** The kit of claim 15 wherein the non-nucleic acid polyanion has a molecular weight of from 1,500 to 500,000 da.

21. **(Currently Amended)** The kit of claim 15 wherein the non-nucleic acid polyanion has a molecular of from 4,000 to 15,000 da.

22. **(Original)** A composition for polynucleotide synthesis comprising: a thermostable polymerase; a non-nucleic acid polyanion; a polymerase reaction buffer having monovalent cations between 35-60 mM; at least one dNTP; a template nucleic acid molecule; and appropriate template nucleic acid primers.

23. **(Currently Amended)** The composition of claim 22 wherein the non-nucleic acid polyanion has a molecular weight of from 1,500 to 500,000 da.

24. **(Currently Amended)** The composition of claim 22 wherein the non-nucleic acid polyanion has a molecular weight of from 4,000 to 15,000 da.

25. **(Currently Amended)** The composition of claim 22 wherein the non-nucleic acid polyanion has a molecular weight of from 4,000 to 10,000 da.

26. **(Original)** The composition of claim 22 wherein the non-nucleic acid polyanion is a synthetic organic polysulfate selected from the group poly(anetholsulfonic acid), polyvinyl sulfate, and 15 polystyrene sulfate.

27. **(Currently amended)** The composition of claim 26 wherein the synthetic organic ~~anionic~~ polysulfate is a sulfated oligo- or polysaccharide.

28. **(Currently Amended)** The composition of claim 27 wherein the sulfated oligo- or polysaccharide is a sulfated polymer or copolymer of the sugars selected from the group consisting ~~essentially~~ of glucose, N-acetyl-glucosamine, galactouronic acid, hyalouronic acid, N-acetyl-galactosamine and fucose.

29. **(Currently Amended)** The composition of claim 28 wherein the sulfated polymer or copolymer of the sugar is selected from the group consisting ~~essentially~~ of dextran sulfate, fucoidan, heparin, heparan sulfate, chondroitin polysulfate, keratan polysulfate, xylan polysulfate, and pentosan polysulfate.

30. **(Original)** The composition of claim 22 wherein the non-nucleic acid polyanion is at a concentration of from 0.1 μM to 1.5 μM.

31. **(Original)** The composition of claim 22 wherein the non-nucleic acid polyanion is at a concentration of from 0.2 μM to 1.0 μM.

32. **(Currently Amended)** The composition of claim 22 wherein the thermostable polymerase is selected from the group consisting ~~essentially~~ of DNA polymerase, RNA polymerase, reverse transcriptase, and mixtures thereof.

33. **(Original)** The composition of claim 32 wherein the thermostable polymerase is a DNA polymerase and the DNA polymerase is from a thermophilic Eubacteria or a Archaebacteria.

34. **(Currently Amended)** The composition of claim 33 wherein the thermostable polymerase is selected from the group consisting ~~essentially~~ of Thermus aquaticus, T. thermophilus, T. brockianus, T. flavus, T. ruber, Thermatoga maritima, Thermoplasma

acidophilus, Pyroccocus furiosus, Pyroccocus woesii, Pyroccocus spec., Sulfolobus spec., and mixtures thereof.

35. **(Currently Amended)** The composition of claim 32 wherein the thermostable polymerase is a reverse transcriptase and wherein the reverse transcriptase is selected from the group consisting ~~essentially~~ of MmLV reverse transcriptase, AMV reverse transcriptase, RSV reverse transcriptase, HIV-1 reverse transcriptase, HIV-2 reverse transcriptase, and mixtures thereof.

36. **(Withdrawn)** The method of claim 12 wherein the non-nucleic acid polyanion has a molecular weight of from 4,000 to 15,000.

37. **(Withdrawn)** The method of claim 12 wherein the non-nucleic acid polyanion has a molecular weight of from 4,000 to 10,000.

38. **(Withdrawn)** The method of claim 8 wherein the modifying of the polymerization mixture to a temperature at which the non-nucleic polyanion is substantially dissociated from the thermostable polymerase is from 60° C to 75° C.

39. **(New)** A method of polynucleotide synthesis, comprising: combining a kit according to claim 15 with a polymerization reaction mixture comprising a target nucleic acid and appropriate primers, wherein the temperature of the polymerization reaction mixture is at a temperature at which the non-nucleic acid polyanion inhibits thermostable polymerase activity; and heating the polymerization reaction mixture to a temperature at which the non-nucleic acid polyanion dissociates from the thermostable polymerase, thereby permitting elongation of the target nucleic acid.

40. **(New)** A method of polynucleotide synthesis, comprising: preparing a polymerization reaction mixture comprising the composition according to claim 32, a template nucleic acid molecule, and appropriate primers for the template nucleic acid molecule, wherein the temperature of the polymerization reaction mixture is at a temperature at which the non-nucleic acid polyanion inhibits thermostable polymerase activity; and heating the polymerization reaction mixture to a temperature at which the non-nucleic polyanion dissociates from the thermostable polymerase, thereby permitting elongation of the template nucleic acid molecule.

41. **(New)** The method of claim 39, wherein the polymerization reaction mixture is heated to a temperature of 60° C to 75° C.

42. **(New)** The method of claim 40, wherein the polymerization reaction mixture is heated to a temperature of 60° C to 75° C.